

(Continued from p. 41)  
red color of the external portion of the tube nearly to the ground. However, the interior of the pitcher is tan-green and not red (cf. 2 and 4 above). Liberty Co., FL.

7) and 8) Hybrid plants of the primary variants 1-5, photographed in the same bogs. Variant parentage may be difficult to determine. In 7, the condensation of what red pigment is there in the lid column suggests a hybrid between 1 and 5 as most likely, but there are other possibilities, including complex back and third crosses. Plant 8 is probably a cross between 4 and 5

above as suggested by the more diffuse pattern of light venation.

#### REFERENCES

1. Schnell, DE. 1978. *Sarracenia flava* L.: Intraspecific variation in eastern North Carolina. *Castanea* 43:1-20.
2. \_\_\_\_\_ 1978. *Sarracenia* L. petal extract chromatography. *Castanea* 43:107-115.
3. \_\_\_\_\_ 1978. Systematic flower studies of *Sarracenia* L. *Castanea* 43:211-220.

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## HOW TO RAISE FRUIT FLIES AS FOOD FOR CARNIVOROUS PLANTS

by R. Douglas Wiggins Jr.  
(140 N.E. 72nd St., Portland, OR)

The semi-closed environment of a terrarium seldom contains enough insect life to provide a hearty diet for most carnivorous plants. I have found that the inclusion of wingless fruit flies provides my plants with enough nutrition that the growth rate is markedly increased. Pitcher plants, *Dionaea* and sundews each benefit from this treatment, although the smaller sundews and larger *Dionaea* sometimes have trouble keeping their prey.

Wingless fruit flies are *Drosophila melanogaster* that have been bred for the recessive gene that causes the wings not to form. Thus, the proper term is not wingless, but vestigial winged. The recessive aspect of this genetic trait means that, if a vestigial winged fly breeds with a wild type fly, all of the first generation offspring will have wings. For this reason, it is necessary to be careful that no wild type flies enter a wingless culture during transfers to other vessels.

It is actually fairly simple to raise fruit flies, as any lover of fruit must notice during the summer. A slice of ripe banana with a dash of yeast is a sufficient medium, but, as the banana decomposes, it becomes runny and often results in drowned fruit flies. A

much better medium can be made of a mixture of corn syrup, corn meal, malt and a trace of fungicide to prevent mold formation. This medium can be further improved by the addition of more nutrients (note: the corn meal is to provide a solid substrate—mashed potato flakes could also be used).

The best and easiest to prepare medium is a dry commercial medium which is prepared by adding an equal volume of water and a few grains of active yeast. This medium can be obtained from biological supply houses in multiples of one liter volumes (one such place that does mail order business is Carolina Biological Supply Co., Burlington, N.C., 27215, or Gladstone, OR. 97027).

Fruit flies are very prolific and have a very short life cycle (that is, the period of time from the egg to the adult). The life cycle involves four stages. At 20 degrees centigrade (room temperature) the fly is in the egg and larval stages for eight days, and in the pupal stage for six days. The fly emerges an adult, and has a fairly long life expectancy. The female will begin laying eggs in a few days, and can lay 500 eggs in ten days

time. The females remain fertile all their lives.

To culture these flies, some medium is placed in a container (there are standard culture tubes available, 1/4" X 4") and a piece of coarse nylon net is added to allow the flies a place to stand (to keep them from getting stuck in the medium) and a porous plug is inserted (gauze or cotton will do, but there is an autoclavable foam plug made) that will fit the culture tubes and that will also neatly fit the neck of a 250 ml. erlenmeyer flask). After the medium sets for a minute, six or eight flies can be introduced by either shaking them into the container, or by inverting the empty container over the container of flies and allowing the flies crawl up into it (fruit flies are phototropic, so a light above the empty container will aid the transfer). In two weeks, more fruit flies will be emerging. If the cultures are kept at slightly higher temperatures, the life cycle will be shortened, but this increases the possibility of mold. Each culture can be kept for one month or longer, but keeping them too long might allow mite infestation. Two or more cultures should be kept, so that if one is lost by mite infestation one will be left as a spare. Never take a culture from a vial that does not appear to be producing multitudinous flies, as this is an indication of mites. In addition, the vials should be kept on "No Bugs M'Lady" shelf paper. This will kill any mites that walk across it, thus avoiding the spread of contamination. If this brand of Lindane treated paper is not available, any shelf paper can be sprayed with a solution of Lindane available at your local nursery. It is a contact pesticide, so it will not harm the flies in the vial.

If one has the desire to aid the growth of small sundews that normally could not hold a live fruit fly, the flies may be killed and fed to the leaf surfaces by hand (a time consuming but rewarding task that normally should be reserved for rare plants). Ether is the best killing agent. A glass jar with a one inch hole cut in the lid will hold the flies, while a cotton plug with ether on it is inserted in the hole. Death is indicated when the wings stand out from the body at

about a 45 degree angle. Alcohol can be used instead of ether, but it is much slower (use denatured alcohol). Carbon dioxide gas or freezing temperatures will also work, but these require even more time. I have found that the use of winged flies for hand feeding is best, as the wings provide a purchase for tweezers. Although it may be possible to collect wild fruit flies by setting out a piece of ripe banana or some grapes (spontaneous generation?), wild flies collected in this fashion may have mite infestation and often do not do well in culture. I use cultures of white eyed fruit flies (as opposed to the wild red eye) in order that I may be certain that I do not receive the blame for the fruit flies around the fruit bowl.

Cultures are available from Carolina Biological Supply Co., Burlington, N.C., 27215, or Gladstone, OR. 97027). Phone number for Gladstone, OR. is 503-656-1641. Prices as of Jan. 9, 1980 are;

- Drosophila cultures—\$3.95@ or two and up for \$3.75..... depends on trait
- Culture Vials—\$2.75 per doz..... 67-4060
- Foam Vial Plugs—\$1.25 per doz..... 67-4062
- Drosophila —\$2.75@..... 67-4080
- Anesthetizer
- Medium—\$3.50 per liter ..... 67-5000
- \$9.50 per 4 " ..... 67-5002



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